



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,894	04/15/2004	Hua-Jun Zeng	MS1-1890US	8978
22801	7590	11/28/2007		
LEE & HAYES PLLC 421 W RIVERSIDE AVENUE SUITE 500 SPOKANE, WA 99201			EXAMINER LE, JESSICA N	
			ART UNIT 2161	PAPER NUMBER
			MAIL DATE 11/28/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/825,894	Applicant(s) ZENG ET AL.	
	Examiner Jessica N. Le	Art Unit 2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 September 2007.
- 2a) ☒ This action is FINAL.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3-15, 17-29, 31-43, and 45-50 is/are pending in the application.
- 4a) Of the above claim(s) 2, 16, 30 and 44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5-15, 17, 19-29, 31, 33-43, and 45-50 is/are rejected.
- 7) ☒ Claim(s) 4, 18 and 32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>09/17/2007 and 11/01/2007</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This communication is responsive to the amendment filed on 09/18/2007.
2. Claims 2, 16, 30, and 44 are cancelled. Claims 1, 15, 29, and 43 are amended.
3. **Claims 1, 3-15, 17-29, 31-43, and 45-50** are presented for examination.
4. This action is made **FINAL**.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1, 3, 5, 7-12, 15, 17, 19, 21-26, 29, 31, 33, 35-40, 43, and 45-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowman et al. US Patent Number 6,006,225 (hereinafter Bowman), in view of Adar et al., US Patent Number 7,136,876 (hereinafter Adar).**

**Regarding claim 1**, Bowman teaches a computer-implemented method for related term suggestion (abstract: "*A search engine is disclosed which suggests related terms*"; and Col. 4, lines 41-42: "*methods for suggesting related terms*"), the method comprising:

mining search results via a multi-sense query (Fig. 7, element 750 – *multi-term query is illustrated as a multi-sense query*), wherein the multi-sense query comprises:

determining terms/phrases semantically related to submitted terms/phrases

(Abstract: “A search engine...suggests related terms...using query term...”); wherein semantic relationships are discovered by mining a context of the term/phrases to determine meaning (Col. 2, lines 60-63: “in the context of a search engine of an online merchant, the search engine tends to suggest related term that correspond to the current best-selling products”);

configuring a threshold frequency of occurrence (FOO) value (Fig. 4, element 410 and Fig. 7, element 770);

assigning historical queries to high FOO or low FOO based on the configured threshold value (Col. 7, lines 14-23 as indicated the threshold values (e.g., in a certain threshold) for assigning historical queries);

responsive to receiving a term/phrase (Fig. 7, element 710 – *receiving each term in the query*; Col. 1, lines 31-32) from an entity, evaluating the term/phrase via the multi-sense query in view of terms/phrases in the term clusters to identify one or more related term suggestions (Col. 4, lines 41-42: “*methods for suggesting related terms*”; and Col. 12, lines 60-67: “...weighted scores for intersecting terms such that terms appearing in more than one related terms list are weighted heavier than those term appearing only in a single related term list”; and Col. 15, lines 55-59 (or Claim 11)), wherein the identifying is based on a combination of FOO and a confidence value (e.g., respective term/phrase frequency of occurrence and term/phrase similarity measurements; Col. 12, lines 60-67: “the selection process 139 combines the related terms lists by summing the correlation scores of terms common to other related terms lists, without deleting any terms... weighted scores for intersecting terms such that terms appearing in more than one related terms list are weighted heavier than those term appearing only in a single related term list”; wherein “the correlations scores of term”, or terms similarity measurement, is illustrated as confidence value; and Col. 6, lines 44-58); and

returning at least one suggested term list ordered by the combination of FOO and confidence value (Fig. 7, elements 760 and 770; and Col. 12, lines 60-67: “*the selection process 139 combines the related terms lists by summing the correlation scores of terms common to other related terms lists, without deleting any terms... weighted scores for intersecting terms such that terms appearing in more than one related terms list are weighted heavier than those term appearing only in a single related term list*”: wherein “the correlations scores of term”, or terms similarity measurement, is illustrated as confidence value), wherein multiple suggested term lists are generated when the term/phrase matches terms in more than one term cluster (Fig. 5A as shown term cluster; and Col. 12, lines 27-34: “*...selected terms to be suggested to the user... returns a query result listing items that match the query correlation table.*”; and Col. 12, lines 60-67: “*...weighted scores for intersecting terms such that terms appearing in more than one related terms list are weighted heavier than those term appearing only in a single related term list*”).

However, Bowman does not explicitly teach generating term vectors from the search results associated with a set of high FOO historical queries previously submitted to a search engine; and generating term cluster as a function of calculated similarity of term vectors;

In the same field of endeavor, Adar teaches:

generating term vectors from search results associated with a set of high FOO historical queries previously submitted to a search engine (Fig. 2, element 108 and 116; Fig. 7, element 720; Fig. 8, elements 814-816; Col. 7, lines 12-30; Col. 8, lines 63-66; and Col. 9, lines 1-41), and generating term clusters as a function of calculated similarity of term vectors (Fig. 1, and Fig. 8, element 814),

It would have been obvious to a person having ordinary skill in the art at the time of Applicant's invention to modify the teachings of Bowman and Adar to include generating term vectors from the search results associated with a set of high FOO historical queries previously submitted to a search engine; and generating term cluster as a function of calculated similarity of term vectors as disclosed by Adar with the motivation to use evaluating the term/phrase in view of terms/phrases in the term clusters to identify one or more related term suggestions as disclosed in Bowman to provide the search based on term suggestion more efficiently.

**Claim 3** is rejected for the reasons set forth hereinabove for claim 1 and furthermore Bowman discloses a method wherein the entity is a computer-program application (Col. 1, lines 37-41; and Col. 5, lines 1-2 – wherein “*server program*” and “*server application*” are illustrated as a computer-program application to be used) and/or an end-user (Col. 4, lines 4-6).

**Claim 5** is rejected for the reasons set forth hereinabove for claim 1 and furthermore Bowman discloses a method further comprising:

collecting historic query terms (Col. 2, line 33: “*on historical query submissions to the search engine.*”) from a query log (Col. 2, line 52: “*a query log file*” & lines 56-57: “*the query log*”; and Fig. 1, element 135); and

determining ones of the historic query terms (Col. 2, line 33: “*on historical query submissions to the search engine.*”) with a high FOO (Fig. 4, element 420 and Fig. 7, element 770).

**Claim 7** is rejected for the reasons set forth hereinabove for claim 1 and furthermore Adar discloses a method wherein evaluating further comprises:

identifying a match between the term/phrase and term(s)/phrase(s) from one or more term clusters (Fig. 7, element 714); and

responsive to identifying, generating related term suggestion(s) comprising the term(s)/phrase(s) (Fig. 7, elements 718-720; and Col. 7, lines 12-25).

**Claim 8** is rejected for the reasons set forth hereinabove for claim 1 and claim 7 and furthermore Bowman discloses a method wherein the related term suggestion(s) (Col. 4, lines 41-42: *"methods for suggesting related terms"*) further comprise for each term/phrase of the term(s)/phrase(s) (Abstract: *"A search engine...suggests related terms...using query term..."*), a frequency of occurrence value (Fig. 4, element 420 and Fig. 7, element 770) indicating a number of times the term/phrase occurs (Col. 10, lines 28-19: *"the number of times the related term occurred in combination with the key term."*) in a set of mined historical queries (Col. 2, line 33: *"on historical query submissions to the search engine."*).

**Claim 9** is rejected for the reasons set forth hereinabove for claim 1 and furthermore Adar discloses:

sending respective ones of the high FOO historical queries to the search engine to obtain the search results (Fig. 1, element 108; Fig. 7, elements 716-720).

extracting features from at least a subset of search results corresponding to the respective ones (Fig. 1; and & Fig. 8).

producing term vectors from the features as a function of term and inverted document frequencies (Col. 7, lines 12-30; Col. 8, lines 63-66; and Col. 9, lines 1-41).

**Claim 10** is rejected for the reasons set forth hereinabove for claims 1 & 9 and furthermore Bowman discloses the features (Fig. 2) comprise a title, description, and/or context (Fig. 2; Col. 2, lines 60-61; and Col. 5, lines 15-22) for the respective ones of the high FOO (Fig. 4, element 420 and Fig. 7, element 770) historical query terms (Col. 2, line 33: "*on historical query submissions to the search engine.*").

**Claim 11** is rejected for the reasons set forth hereinabove for claims 1 & 9 and furthermore Bowman discloses the respective ones comprise top ranked ones of the search results (Fig. 8A & 8B; and Fig. 9).

**Claim 12** is rejected for the reasons set forth hereinabove for claim 1 and furthermore Bowman discloses the term clusters (Abstract: "...*The related terms are generated using query term...in the same query.*"; and Col. 3, lines 6-7: "*generate a set of related terms for refining a submitted query*") are a first set of term clusters (Col. 3, lines 6-7: "*generate a set of related terms for refining a submitted query*" wherein a first set of term cluster to be generated and used through this processing), and wherein the method further comprises:

determining that there is no match between the term/phrase and the terms/phrases (Fig. 7); and

responsive to the determining:



evaluating the term/phrase in view of terms/phrases of the second set of term clusters to identify one or more related term suggestions (Col. 15, lines 55-59 (or Claim 11); and Col. 4, lines 41-42: "*methods for suggesting related terms*").

However, Bowman does not explicitly teach making a second set of term clusters from calculated similarity of term vectors (Fig. 1, and Fig. 8, element 814), each term vector being generated from search results associated with a set of low FOO historical queries previously submitted to the search engine.

In the same field of endeavor, Adar teaches making a second set of term clusters from calculated similarity of term vectors, each term vector being generated from search results associated with a set of low FOO historical queries previously submitted to the search engine (Fig. 2, element 108 and 116; Fig. 7, element 720; Fig. 8, elements 814-816; Col. 7, lines 12-30; Col. 8, lines 63-66; and Col. 9, lines 1-41).

**Claims 15, 17, 19, and 21-26** recite "*a tangible computer-readable data storage medium*", **claims 29, 31, 33, and 35-40** recite "*a computing device*", and **claims 43, 45-49** recite "*a computing device*" for performing a method similar to claims 1, 3, 5, & 7-12, and therefore these claims are rejected by the same reasons.

**6. Claims 6, 13-14, 20, 27-28, 34, 41-42, & 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowman in view of Adar, further in view of Bennett US PG Publication No. 2004/0117189 (hereinafter Bennett).**

**Claim 6** is rejected for the reasons set forth hereinabove for claim 1.

However, the combination of Bowman and Adar does not explicitly teach before creating the term clusters: reducing dimensionality of the term vectors; and normalizing the term vectors.

In the same field of endeavor, Bennett discloses a method further comprising before creating the term clusters:

reducing dimensionality of the term vectors (Paragraph [0361]: “a term vector” and Paragraph [0386]: “*which allows all logically possible (even linguistically impossible) word sequences and which reduces the task perplexity via probabilistic modeling of the N-gram sequences*”); and  
normalizing the term vectors (Paragraphs [0361]-[0366]).

It would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made to modify the teachings of Bowman, Adar, and Bennett to include reducing dimensionality of the term vectors and normalizing the term vectors as disclosed by Bennett with the motivation to use generating term clusters as disclosed in Bowman to allow providing searching term suggestion for multi-sense query more efficiently.

**Claim 13** is rejected for the reasons set forth hereinabove for claim 1 and claim 12 and furthermore Bowman discloses:

identifying the low FOO historical queries (Fig. 7, elements 750, 760 and 770 – wherein exists a low FOO historical queries to be used when there is a match between a multi-term query and all related terms lists/phrase(s)) from historical queries (Col. 2, line 33: “*on historical query submissions to the search engine.*”) mined from a query log (Col. 9, lines 8-9: “within the *query log 135*”);

sending respective ones (Col. 3, line 1) of at least a subset of the low FOO (Fig. 7, elements 750, 760 and 770 – wherein exists a low FOO historical queries to be used when there is a match between a multi-term query and all related terms lists/phrase(s)) historical queries to the search engine (Col. 2, line 33: “*on historical query submissions to the search engine.*”) to obtain search results (Fig. 9; and Col. 9, line 5: “*from a search results page*”);

extracting features from at least a subset of search results (Fig. 8A & 8B; and Fig. 9; and Col. 9, lines 41-43)

However, the combination of Bowman and Adar does not explicitly teach producing the term vectors from the features as a function of term and inverted term frequencies.

In the same field of endeavor, Bennett discloses producing the term vectors from the features as a function of term (Paragraphs [0361]-[0366]) and inverted document frequencies (Paragraph [0369]).

It would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made to modify the teachings of Bowman, Adar, and Bennett to include producing term vectors from the features as a function of term and inverted term frequencies as disclosed by Bennett to identifying the low FOO historical queries as disclosed in Bowman to allow providing searching term suggestion for multi-sense query more narrow down results.

**Claim 14** is rejected for the reasons set forth hereinabove for claim 1 and claim 13 and furthermore Bowman discloses a method further comprising after clustering:

determining that there is no match between the term/phrase and term(s)/phrase(s) from the first set of term clusters, the first set being based on high FOO historical queries (Claim 15; Fig. 7, elements 750,760, 770); and

responsive to the determining, identifying a match (Col. 1, lines 31-41) between the term/phrase and term(s)/phrase(s) from one or more of the second set of term clusters, the second set being based on low FOO historical queries (Fig. 7, elements 750, 760 and 770 – wherein exists a low FOO historical queries to be used when there is a match between a multi-term query and all related terms lists/phrase(s)); and

responsive to identifying (Col. 1, lines 31-41), generating related term suggestion(s) (Col. 3, lines 6-7: “*generate a set of related terms for refining a submitted query*”) comprising the term(s)/phrase(s) (Abstract: “*A search engine...suggests related terms.....using query term...*”; and Col. 12, lines 27-34).

**Claims 20, & 27-28** recite “*a tangible computer-readable data storage medium*”, **claims 34, & 41-42** recite “*a computing device*”, and **claim 50** recite “a computing device” (means for) for performing a method similar to claims 6, & 13-14, and therefore these claims are rejected by the same reasons.

#### ***Allowable Subject Matter***

7. **Claims 4, 18, and 32** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

8. Applicant's arguments filed on 09/18/2007 with respect to claims 1, 3, 5-15, 17, 19-29, 31, 33-43, and 45-50 have been carefully considered but they are not persuasive.

Regarding independent claims 1, 15, 29, and 43, these claims would not overcome the cited art as indicated above rejections. The teaching of Bowman in view of Adar includes the claimed limitations as required by amended claims.

Regarding claims 4, 18, and 32, Applicant's arguments have been fully considered and are persuasive. The rejection of these claims has been withdrawn.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2161

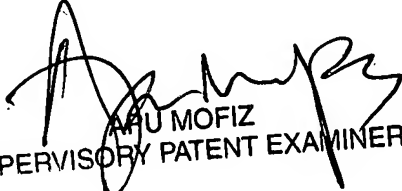
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica N. Le whose telephone number is (571) 270-1009 and fax number is (571) 270-2009. The examiner can normally be reached on M-F 6:30 am - 3:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu M. Mofiz can be reached on (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jessica Le  
11/24/2007  
/JL/

KBP

  
APU MOFIZ  
SUPERVISORY PATENT EXAMINER